UNITED
NATIONS

ST

Secretariat

Distr.
GENERAL

ST/SG/AC.10/C.3/1997/91
16 October 1997

ENGLISH
Original: ENGLISH AND FRENCH

COMMITTEE OF EXPERTS ON THE
TRANSPORT OF DANGEROUS GOODS

Sub-Committee of Experts on the
Transport of Dangerous Goods
(Fourteenth session,
Geneva, 8-18 December 1997,
agenda item 4 (b))

GLOBAL HARMONIZATION OF SYSTEMS OF CLASSIFICATION AND LABELLING OF CHEMICALS

Physical hazards

European Aerosol Federation (FEA) Position on Global Harmonisation Flammability Criteria of Aerosols

Transmitted by the European Aerosol Federation (FEA)

Background

At the Rio Summit meeting of Governments in 1992, it was agreed that there should be harmonisation of hazard classification in order to reduce obstacles to international trade and to reduce the burden on manufacturers.

The work on flammable liquids and gases was given to the United Nations Sub-Committee on the transport of dangerous goods. Several papers have been submitted concerning aerosols, from the USA, Norway, Germany and the UK. At the Geneva meetings in December 1997, the Sub-Committee will discuss the issue of aerosol classification again for the last time.

The European Commission has produced a paper setting out its position and believes that harmonisation on the current Transport Regulations basis of 45% flammable components is undesirable and that harmonisation should take place according to the revised EC Directive's classification principles for consumer use.

However, the hazard which exists during transport, storage and handling is quite different from the risk to the consumer when using the product. Under normal conditions the contents will be not be emptied during transport or handling; it will however during normal consumer use of the product.

Europe produces and consumes 4 billion of the world's 10 billion aerosols. It is therefore the largest sector in the global market for aerosols.

FEA Position

While understanding and sympathising with the intention of the global harmonisation initiative; the FEA does not believe that a single classification covering all situations is feasible.

Ideally, separate classification for transport, storage and handling on the one hand and consumer use on the other hand, should be maintained as these take account of completely different types of risk.

A simple transport classification and more complex consumer use classification is justified. For **transport**, FEA supports the current **UN recommendations on the transport of dangerous goods model regulations**.

To maintain a high safety level for **consumer** use, the FEA proposes to focus on the **parameters and results of a test method**, rather then describing the test method itself.
The results of the test will determine the flammability and explosion risks, leading to the appropriate classification for consumer use.
Test parameters should include that the test represents realistic and foreseeable circumstances of use; be reproducible and measurable. For Europe, it means to follow the existing EC Directive.

It is the intention of FEA to further work on harmonisation criteria of storage in close co-operation with the regulatory bodies and other aerosol associations around the world.

Arguments

Under the EC Aerosol Directive, aerosols are required to be leak and pressure tested at elevated temperature.

> The industry knows of no incidents in transport in Europe directly caused by aerosols in the last ten years, hence the FEA proposes to adhere to the existing UN recommendations.
>
> This FEA position is fully supported by the Chemical Specialities Manufacturers Association (CSMA), the American Aerosol Association.

The hazards are different for transport, storage and handling than for consumer use.

Under normal conditions during transport, storage and handling:

> the product is not released from the can
> the product is hermetically sealed in small containers (small quantities)

Under normal conditions during consumer use:

> The product is specifically intended to be released from the can (in small amounts)
> Because of the human factor, a consumer misuse should be taken into account

From the above it is clear that the risk during consumer use is significantly different than for transport.

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Distr.
GENERAL

ST/SG/AC.10/C.3/1997/92
24 October 1997

ENGLISH ONLY

COMMITTEE OF EXPERTS ON THE
TRANSPORT OF DANGEROUS GOODS

Sub-Committee of Experts on the
Transport of Dangerous Goods
(Fourteenth session,
Geneva, 8-18 December 1997,
agenda item 2 (a))

DRAFT AMENDMENTS TO THE MODEL REGULATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Tanks

Report of the IMO Working Group on Portable Tanks

Transmitted by the International Maritime Organization (IMO)

1 The Portable Tanks Working Group met from 2 to 4 September 1997 under the chairmanship of Mr. K-J. Döhrn (Germany).

2 The Group was attended by delegations from:

FRANCE
GERMANY
NETHERLANDS
SWEDEN
UNITED KINGDOM
UNITED STATES

3 The Group reviewed and developed amendments to the draft reformatted IMDG Code text for portable tanks which were provided by the Secretariat based on the text adopted by the nineteenth session of the UN Committee of Experts, taking into account sea mode specific requirements necessary to be included in the IMDG Code. A revised draft text is annexed to this report (Annexes 2, 3, 4 and 5) */ for consideration and approval by DSC 3. For ease of reference, new text is shaded and the equivalent IMDG Code text is shown underneath with the text being stuck through to indicate that it will be deleted.

4 The Group requests the class 7 Working Group, at DSC 3, to provide guidance on which class 7 requirements should be included in paragraph 4.2.1.15, "Additional general requirements applicable to the transport of class 7 materials in portable tanks".

5 The following are recommendations developed by the Group which should be conveyed to the UN Committee of Experts for its consideration:

.1 The Group, in considering paragraph 4.2.1.9.6, agreed that the UN text is not entirely appropriate for elevated temperature substances because the filling and surge plate requirement for these substances should be based on the temperature of the substance in transport and not on a reference temperature of 20 °C. The Group agreed that this should be brought to the attention of the UN Committee of Experts and that no changes in the IMDG Code text should be made until the UN considers the issue. The Group proposed to amend paragraph 4.2.1.9.6 as follows:

After the words "...at 20 °C" in the first sentence, add the words "or maximum temperature of the substance during transport in the case of a heated substance".

.2 The Group decided to delete paragraph 4.2.1.11.1, because it was considered misleading since there are no additional requirements applicable to class 4.1 substances.

.3 The Group found the text "additional general requirements" unsuitable and agreed that the word "general" was not necessary in paragraphs 4.2.1.10, 4.2.1.11, 4.2.1.12, 4.2.1.13, 4.2.1.14, 4.2.1.15, 4.2.1.16, 4.2.1.17.

.4 In paragraph 4.2.1.13.4, the Group noted that the use of the MPa is not consistent with the use of kPa elsewhere in the text.

.5 In paragraph 4.2.2.2, "non-" should be added after "specific" and before "refrigerated". This is a typographical error which needs to be corrected in the UN Recommendations.

.6 In paragraph 4.2.3.2, the reference to 6.6.3 should be changed to 6.6.4. This is a typographical error which needs to be corrected in the UN Recommendations.

.7 In paragraph 4.2.4.1.1, "(T 1 to T 36)" should be changed to "(T 1 to T 75)". This is a typographical error which needs to be corrected in the UN Recommendations.

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*/ *Annexes 2 and 3 are not reproduced here as they contain the text of Chapters 4.2 and 6.6 respectively.*

.8 In the UN Recommendations T 50 should be amended to include tank provisions contained in 13.100 of the IMDG Code for UN 1060, UN 1078, UN 2035, UN 3057, UN 3070, UN 3161 and UN 3163. These are currently listed in Table 13.100 of the IMDG Code.

.9 Tank Provision 14 should be deleted since all substances assigned to Tank Provision 14 are required to be transported in 10 bar test pressure portable tanks.

.10 The Group noted that Tank Provision 11 and 15 should be deleted in accordance with previous decisions, reflected in the DSC 2 report, and the rationalized approach for portable tanks.

.11 In paragraph 6.6.2.13.1 "plainly" should be changed to "clearly".

.12 The Group found that paragraph 6.6.3.8.1.1 in the tenth revised edition of the UN Recommendations was not consistent with the text in the report of the nineteenth session of the UN Committee of Experts (COE). The text in the tenth revised edition should be amended to be consistent with the report of the COE. The Group did not find other discrepancies between the COE report and the tenth revised edition. However, it was felt that the IMO Secretariat should ask the UN Secretariat if other differences were introduced in the tenth revised edition.

6 The Group noted the German proposal concerning the use of tank strings for marking portable tanks and took note that this issue will be considered by the Joint RID/ADR Meeting in September 1997 and the UN Sub-Committee of Experts in December 1997. Decisions taken at the UN Sub-Committee meeting should be considered at DSC 3.

7 The Group compared the special tank requirements in the new reformatted UN Recommendations and the IMDG Code (Amdt. 28). The following relevant comments and recommendations are reflected in Annex 1:

(i) This special requirement states "Tank material to be stainless steel". This only applies to UN 2250 Dichlorophenyl Isocyanate molten or resolidified. This should be deleted because, in practice, the selection of material is left up to the shipper and manufacturer. According to the BAM list, steel other than stainless steel is an acceptable construction material for portable tanks intended for the transport of Dichlorophenyl Isocyanate. It was also discovered that the UN Recommendations do not include transport of this substance in tanks.

(j) Special requirement (j) applies to PG I N.O.S. entries. This is partially covered by Tank Provision 9, however, (j) only applies to PG I whereas Tank Provision 9 does not. This is because Tank Provision 9 is only assigned to PG I substances in the reformatted UN Dangerous Goods List (DGL); therefore, the reference to the PG I is unnecessary.

(k) Special requirement (k) requires additional thickness for substances highly corrosive to ship's structure. This is not covered in the UN text. The Group decided not to require an additional 2 mm for highly corrosive substances. Paragraph 13.1.5 has been deleted in the IMDG Code draft reformatted text.

(m) Special requirement (m) states: "May only be carried in the solid state". A new tank provision should be incorporated in the UN Recommendations and the reformatted IMDG Code text to include this provision for White Phosphorus, UN 1381; Potassium Sodium Alloys, UN 1428 and Potassium, UN 2257.

(q) Special requirement (q) indicates "see 13.1.55.1". This is covered in paragraph 4.2.1.13 in the UN Recommendations. The Group agreed that it is not necessary to include a special provision for each organic peroxide because this requirement is a general requirement for all organic peroxides. This special requirement should not be included in the reformatted IMDG Code.

(r) Special requirement (r) includes a statement concerning the safe transport of Tetra-butyl hydroperoxide, UN 3109. This is covered in note 1 of T 34 in the current UN text and need not be retained in the reformatted IMDG Code.

(s) Special requirement (s) includes a labelling exception for Cumyl hydroperoxide when the concentration is below 80%. This is not necessary and is not a tank requirement. It is covered in 2.5.3.2.4, note 18 in the UN Recommendations. It need not be retained in the reformatted IMDG Code.

(t) Special requirement (t) indicates that the maximum quantity per tank is 2000 kg. This is covered by note 2 in T 34. Special requirement (t) need not be retained in the reformatted IMDG Code.

(u) This special requirement applies to Sulphur Trioxide, UN 1829; White Phosphorus, Molten, UN 2447 and Flammable Solid, Organic, Molten, N.O.S., UN 3176. The Group agreed that this requirement should be included in both the UN Recommendations and the reformatted IMDG Code as a new tank provision note as follows:

> "Tank Provision [26] When transported under heated conditions, the heating device should be fitted outside the shell."

(v) This special requirement provides temperature limitations for Methacrylic Acid, UN 2351 and Sulphur Trioxide, Inhibited, UN 1829. Special Provision 269 is consistent with the temperature control conditions currently on the schedule for Sulphur Trioxide. Special Provision 269 in the UN Recommendations should be changed to a tank provision, because it only applies to the transport of Sulphur Trioxide in tanks. A new tank provision should be incorporated in the UN Recommendations and the reformatted IMDG Code as follows:

> "Tank Provision[25] Sulphur Trioxide 99.95% pure and above may be transported in tanks without an inhibitor providing that it is maintained at a temperature equal to or above 32.5 °C."

Tank Provision 18 already covers the temperature control conditions for Methacrylic Acid.

(w) This limits filling to 88% of capacity. It applies to Sulphur Trioxide, Inhibited, UN 1829 only. If it is changed to 90%, then Tank Provision 4 can be applied to UN 1829. The UN Recommendations should also be amended by changing Tank Provision 2 in column (11) of the Dangerous Goods List to Tank Provision 4 for UN 1829.

8 The Group considered the reformatting of the text for road tank vehicles (currently IMO Types 4, 6 and 8). The IMO designations for these road tanks were changed and set out in a new section 6.7 in the reformatted IMDG Code text. The existing IMDG Code requirements applicable to road tank vehicles were reformatted with suitable amendements and included in the new section for road tank vehicles in chapter 6.7 (see annex 3) to this report.

9 The Group developed text to allow the continued use of IMO Type 1, 2, 5 and 7 portable tanks after the coming into force of the new requirements on 1 January 2001. The text would allow continued use of these tanks on the basis that they comply with the periodic inspection and test requirements. The grandfather clause would be included in chapter 4.2, "Use of Portable Tanks" as follows:

Immediately following the title of chapter 4.2 "Use of Portable Tanks" insert the following text:

"The requirements for the use and construction of portable tanks in this chapter and chapter 6.6 are based on the internationally harmonized multimodal requirements developed by the United Nations Committee of Experts on the Transport of Dangerous Goods. Portable tanks may continue to be constructed in accordance with IMO Type 1, 2, 5 and 7 portable tank requirements until 1 January 2003.

Portable tanks and road tank vehicles certified and approved prior to 2003 in accordance with the requirements of the IMDG Code in force when the tanks were constructed, may continue to be used provided that they meet the applicable periodic inspection and test requirements."

10 The Group responded to the questions in paragraph 3.5.11 in DSC 2/16 as follows:

.1 Based on the grandfather clause proposed by the Group, IMO portable tanks will be allowed to be built until 2003.

.2 The proposed grandfather clause allows for continued use of IMO portable tanks and road tank vehicles provided they meet the periodic inspection and test requirements.

.3 It is expected that other regulations will include grandfather clauses which will also allow continued use of IMO tanks.

.4 It was felt that adoption of a single grandfather clause was a more effecient and user-friendly means of addressing the differences between existing IMO portable tanks and the new multimodal portable tanks.

.5 The Group felt that the old Section 13 should not co-exist in the new reformatted Code. It was, however, recognized that the definition of IMO tank types and the marking requirements for these tanks should be kept.

.6 The Group included the existing requirements for IMO Type 4, 6 and 8 portable tanks (road tank vehicles) in a new chapter 6.7 of the reformatted Code. The content of the requirements were not changed in principle during the reformatting.

.7 The Group developed amended text for Section 25, paragraph 25.1.4, as follows:

> "Certain solid dangerous substances and materials are permitted in portable tanks which should be of a type which is at least consistent with portable tank instruction T1 (see 4.2.4.2.6)."

.8 It was agreed that an additional 2mm thickness (mild steel) would not be necessary in view of the new requirements. Special tank requirement (k) was subsequently deleted.

.9 Other issues regarding the implementation of the new UN text are addressed in other parts of this report.

11 The Group reformatted the text pertaining to the transport of solids in portable tanks. This text was placed in a new chapter 6.8. The reformatted text is annexed to this report (annex 2).

12 The Group considered the text provided by the Secretariat concerning paragraph 13.1.23.1 regarding forklift pockets and the marking of offshore containers. This text is not considered in the UN Recommendations and the Group felt that it should be included in both the UN Recommendations and the reformatted IMDG Code. The following amendments are proposed in both the UN Recommendations and the reformatted IMDG Code.

It is proposed that three new paragraphs (4.2.1.9.7, 4.2.2.9 and 4.2.3.9) be added. The paragraphs should state:

> "Forklift pockets of portable tanks shall be closed off when the tank is filled. This provision does not apply to portable tanks which according to 6.6.2.17.4, 6.6.3.13.4 or 6.6.4.12.4, as appropriate, need not be provided with a means of closing off the forklift pockets."

It is proposed that three new paragraphs (6.6.2.20.3, 6.6.3.16.3 and 6.6.4.15.3) be added. The paragraphs should state: "If a portable tank is designed and approved for handling in open seas, the words "OFFSHORE PORTABLE TANK" should be marked on the identification plate.

* * *

ANNEX 1

GENERAL INTRODUCTION

Column 8: Bottom openings

A: Bottom openings allowed (2 shutoff devices).
B: Bottom openings allowed (3 shutoff devices).
C: No bottom openings allowed.

Column 9: Minimum shell thickness in mild steel

Normally as defined in 13.1.5 where tank shell thickness is regulated.

Where the calculations according to 13.1.4 require a greater thickness than found in column 9 for the tank shell, this shell thickness should be adopted.

Column 10: Special requirements

TP 7 (a): Stowage under Nitrogen blanket or other means of inert gas.

TP 13 (b): Additional self-contained breathing apparatus to be provided on board.

TP 12 (c): Highly corrosive to steel.

TP 10 (d): With a 5 mm lead lining, which must be tested annually, or suitable lining accepted by the competent authority.

TP 6 (e): To prevent the tank bursting in any event, including fire engulfment, it should be provided with pressure-relief devices which are adequate in relation to the capacity of the tank and to the nature of the substance carried. The device must also be compatible with the substance.

TP 11 (f): May be filled, discharged or transported at elevated temperatures in insulated tanks. Heating may or may not be applied; see 13.1.27.

TP 20 (h): Transported in insulated tanks. TP 20 has also nitrogen blanket.

(i): Tank material to be stainless steel. Can now be deleted.

TP 9 (j): Any substance that meets the criteria for packaging group I should not be carried under this description except under conditions laid down by the competent authority.

(k): If the substance or the mixture of substances is highly corrosive to ships' structure, i.e. mild steel, a constant C = 171 should be used in 13.1.5. This is no longer necessary, based on the decision to exclude 2 mm extra thickness.

(m): May only be carried in the solid state.
Need to add this to the UN Recommendations. This conflicts with the ability to fill or empty tanks.

TP 16 (n): The tank should be fitted with a special device to prevent under -and over-pressure, during normal transport conditions. This device should be approved by the competent authority. NF is required to prevent crystallization of the product in the pressure-relief valve.

TP 17 (p): Only inorganic, non-combustible materials should be used for thermal insulation of the tank.

(q): See 13.1.55.1. This is already covered in 4.2.1.13, in the UN Recommendations and therefore is no longer necessary.

(r): Provided that steps have been taken to achieve the safety equivalence of 65% tert-butyl hydroperoxide and 35 % water. This is covered in T 34.

(s): No subsidiary risk label of **class 8** required for concentrations below 80%. This is not considered necessary because it is covered in 2.5.3.2.4.

(t): Maximum quantity per portable tank 2,000 kg, loaded and unloaded in the molten state, transported as solid. This is not considered necessary because it is covered by note 2 of T 34.

(u): When transported under heated conditions, the heating device should be fitted outside the shell. Need to add this to the UN Recommendations.

(v): To be carried under special temperature conditions. Tank Provision 14 for UN 2531 SP 269 for 1809.

(w): Special filling limits are to be observed. The tank should not be filled to more than 88% of its capacity at any time during transport.
Change to 90% and assign TP 4 to UN 1829.

***

ANNEX 4

CHAPTER 6.7

6.7 Requirements for road tank vehicles

6.7.1 General

6.7.1.1 Definitions

~~13.1.2.16~~

Road Tank Vehicle. A vehicle fitted with a tank intended for the transport of dangerous goods by both road and sea modes of transport, the tank of which is permanently or rigidly attached to the vehicle during all normal operations of filling, discharge and transport and is neither filled nor discharged on board and is driven on board on its own wheels.

~~13.1.2.17~~

Short international voyage. Short international voyage means an international voyage in the course of which a ship is not more than 200 miles from a port or place in which the passengers and crew could be placed in safety. Neither the distance between the last port of call in the country in which the voyage begins and the final port of destination nor the return voyage should exceed 600 miles. The final port of destination is the last port of call in the scheduled voyage at which the ship commences its return voyage to the country in which the voyage began.

~~13.1.2.18~~

Long international voyage. Long international voyage means an international voyage that is not a short international voyage.

~~13.1.2.15~~

LS-type. LS-type tank is a road tank vehicle for the transport of dangerous goods of classes 3 to 9 and includes a semi-trailer with a permanently attached tank or a tank attached to a chassis, with at least four twist locks which comply with ISO standards, ISO International Standard 1161: 1984, having a capacity of more than 450 litres fitted with pressure relief devices. Such a road tank should comply with the requirements of the competent authority. It need not comply fully with the requirements of chapters 4.2 and 6.6. Special requirements for LS-type tanks are given in 6.7.3.1. LS-type tanks should only be used on short international voyages.

~~13.102.15~~

G-type. G-type tanks means a road tank vehicle for the transport of non-refrigerated liquefied gases of class 2 and includes a semi-trailer with a permanently attached tank or a tank attached to a chassis which is fitted with items of service equipment and structural equipment necessary for the transport of gases and fitted with pressure relief devices. It should be fitted with permanent attachments such that it can be secured on board ship; however, its contents should not be filled or discharged whilst the vehicle remains on board. A G-type tank should only be used on short international voyages.

~~13.202.2.1~~

RG-type. RG-type tank means a road tank vehicle for the transport of refrigerated liquefied gases of class 2 and includes a semi-trailer with a permanently attached thermally insulated tank fitted with items of service equipment and structural equipment necessary for the transport of refrigerated liquefied gases. It should be fitted with permanent attachments such that it can be secured on board ship; however, its contents should not be loaded or discharged whilst the vehicle remains on board. A RG-type tank should only be used on short international voyages.

~~13.1.18~~

6.7.1.2 Tank support frameworks, fitting and tie-down attachments*

~~13.1.18.4~~

6.7.1.2.1 Road tank vehicles should be designed and manufactured with supports to provide a secure base during transport and with suitable tie-down attachments. The tie-down attachments should be located on the tank support or vehicle structure in such a manner that the suspension system is not left in free play.

~~13.1.18.6~~

6.7.1.2.2 Tanks should be carried only on vehicles whose fastenings are capable, in conditions of maximum permissible loading of the tanks, of absorbing the forces specified in 6.6.2.2.12, 6.6.3.2.9 and 6.6.4.2.12.

~~13.1.24~~

6.7.2 Road tank vehicles for long international voyages

6.7.2.1 Design and construction

~~13.1.24.1~~

6.7.2.1.1 A road tank vehicle for long international voyages should be fitted with a tank complying with the requirements of chapters 4.2 and 6.6 and should comply with the relative requirements for tank supports, frameworks, lifting and tie-down attachments in 6.6.2.17.1 to 6.6.2.17.3 and in addition comply with the requirements of 6.7.1.2.1 and 6.7.1.2.2.

6.7.2.2.1 For approval, testing and marking of the tank, see chapter 6.6.

6.7.2.2.2 The tank supports and tie-down arrangements* of vehicles for long international voyages should be included in the visual external inspection provided for in 6.6.2.19.

~~13.1.24.4~~

6.7.2.2.3 The vehicle of a road tank vehicle for long international voyages should be tested and inspected in accordance with the road transport requirements of the competent authority of the country in which the vehicle is operated.

6.7.3 Road tank vehicles for short international voyages

6.7.3.1 LS-type

6.7.3.1.1 General

~~13.1.24.2~~
6.7.3.1.1.1 LS-type tank is a road tank vehicle as defined in 6.7.1.1 and should either:

.1 comply with the requirements of 6.7.2; or

.2 be constructed as a LS-type tank as defined in 6.7.1.1, complying with the requirements of 6.7.3.1.2 and 6.7.3.1.3.

~~13.1.24.5~~
6.7.3.1.2 Design and construction

~~13.1.24.5.1~~
6.7.3.1.2.1 LS-type tanks should only be authorized for short international voyages. They should comply with the requirements of 6.6.2.2, 6.6.2.3, 6.6.2.4 and 6.6.2.17 or, if they do not comply fully with these requirements, they should be certified by the competent authority for road transport of the substances to be transported by road and should at least comply with the following minimum requirements:

.1 they should have been subjected during construction to a minimum hydraulic test pressure equal to that specified in column 12 of the Dangerous Goods List;

.2 the thickness of cylindrical portions and ends in reference steel should be:

.2.1 not more than 2 mm thinner than the thickness specified in column 12 of the Dangerous Goods List;

.2.2 subject to an absolute minimum thickness of 4 mm of reference steel; and

.2.3 for other materials, subject to an absolute minimum thickness of 3 mm;

.3 the maximum effective gauge pressure developed by the substances to be transported should not exceed the maximum allowable working pressure of the tank; and

.4 the primary combined stresses in supports, tie-down attachments* and tank structures in way of them due to static forces and to dynamic forces as defined in 6.6.2.2.12 should not exceed 0.8*Re*, where *Re* is explained in 6.6.2.3.3. The said stresses may be calculated or measured.

~~13.1.24.5.2~~
6.7.3.1.2.2 The materials of construction of LS-type tanks, if they do not comply with the requirements of 6.6.2.2.1 to 6.6.2.2.7, should at least comply with the requirements of the competent authority for transport by road.

~~13.1.24.5.3~~

6.7.3.1.2.3 Tank supports on permanently attached LS-type tanks, if they do not comply with the requirements of 6.6.2.17, should at least comply with the requirements of the competent authority for transport by road.

~~13.1.24.5.5~~

6.7.3.1.2.4 The protection of valves and accessories of LS-type tanks should at least comply with the requirements of the competent authority for transport by road.

~~13.1.24.5.6~~

6.7.3.1.2.5 The joints in shells of LS-type tanks should at least be made by fusion welding and comply with the requirements of the competent authority for transport by road.

~~13.1.24.5.7~~

6.7.3.1.2.6 LS-type tanks should at least be provided with manholes or other openings in the tank which comply with the requirements of the competent authority for transport by road.

~~13.1.24.5.8~~

6.7.3.1.2.7 Tank nozzles and external fittings on LS-type tanks should at least comply with the requirements of the competent authority for the transport by road of the substances to be transported by road, except that, irrespective of road requirements, tanks with bottom openings should not be used for substances for which bottom openings would not be permitted for transport by sea in other types of tanks, unless existing openings and hand inspection holes are closed by bolted flanges mounted both internally and externally, fitted with product-compatible gaskets. Such arrangements should be approved by the competent authority.

~~13.1.24.5.9~~

6.7.3.1.2.8 All LS-type tanks should be closed tanks and, if they do not comply with the requirements of 6.6.2.7 to 6.6.2.15, they should at least be fitted with pressure-relief devices of the type required by the tank type in the Dangerous Goods List. The devices should be acceptable to the competent authority for the transport by road of the substances to be transported. The start-to-discharge pressure of such devices should in no case be less than the maximum allowable working pressure, nor greater than 25% above that pressure.

6.7.3.1.3 Approval, testing and marking

~~13.1.24.5.4~~

6.7.3.1.3.1 LS-type tanks should, as a minimum, be tested and inspected in accordance with the requirements of the competent authority for the transport by road of the substances to be transported by road.

~~13.1.24.5.10~~

6.7.3.1.3.2 LS-type tanks should be attached to the chassis when transported on board ship. LS-type tanks which are not permanently attached to the chassis should be marked "[IMO-LS type]" in letters at least 32 mm high.

~~13.1.24~~

6.7.3.2 Type G

6.7.3.2.1 General

~~13.1.24.2~~

6.7.3.2.1.1 G-type tank is a road tank vehicle, as defined in 6.7.1.1, and should either:

.1 comply with the requirements of 6.7.2; or

.2 be constructed as a G-type tank as defined in 6.7.1.1, complying with the requirements of 6.7.2 and 6.7.4.3.

~~13.102.18~~

6.7.3.2.1.2 Competent authority means, in respect of those requirements solely applicable to road tank vehicles, the authority concerned with approval for transport by sea and also the authority concerned with approval for transport by road.

6.7.3.2.1.3 For a G-type tank the design temperature range, as defined in 6.6.3.1, the temperature to be taken is to be agreed by the competent authorities.

6.7.3.2.2 Design and construction

6.7.3.2.2.1 The G-type should comply with the requirements of 6.6.3, with the exception of:

.1 [6.6.3.3.2];

.2 6.6.3.5.7;

.3 6.6.3.6.1;

.4 6.6.3.7.1, but for G-type tanks the devices should open at a pressure not less than 1.0 times the MAWP and be fully open at a pressure not exceeding the test-pressure;

~~13.109.2~~

.5 6.6.3.8, but for G-type tank the delivery capacity of the pressure-relief devices should be subject to the agreement of the competent authority;

.6 6.6.3.11.1, first sentence;

.7 6.6.3.2.10; and

.8 6.6.3.13.4.

~~13.114.3~~

6.7.3.2.2.2 If the landing legs of a G-type tank vehicle are to be used as support structure, the loads specified in 6.6.3.2.9 should be taken into account in their design and method of attachment. Any bending stress induced in the shell as a result of this manner of support should also be included in the design calculations.

~~13.114.5 and 13.212.2.1~~

6.7.3.2.2.3 Securing arrangements (tie-down attachments) should be fitted to the tank support structure and the towing vehicle of a G-type tank. Semi-trailers unaccompanied by a towing vehicle should be accepted for shipment only if the trailer supports and the securing arrangements and the position of stowage are agreed by the competent authority.

~~13.114.6~~

6.7.3.2.2.4 In the design of supports and frameworks, due regard should be paid to the effects of environmental corrosion, and in calculations for all structural members not constructed of corrosion-resistant materials a minimum corrosion allowance, determined by the competent authority, should be provided.

~~13.116 and 13.214~~

6.7.3.2.3 Approval, testing and marking

~~13.116.2 and 13.214.2~~

6.7.3.2.3.1 For any G-type tank intended for transport of a substance listed in the Dangerous Goods List, there should be in existence a valid certificate issued by or on behalf of the competent authority for road transport.

~~13.116.3~~

6.7.3.2.3.2 The competent authority for sea transport or a body authorized by that authority should issue additionally, in respect of a G-type, a certificate attesting compliance with the relevant design, construction and equipment requirements of this chapter and, where appropriate, the special requirements for the gases listed in the Dangerous Goods List. The certificate should list the gases allowed to be transported.

~~13.116.4~~

6.7.3.2.3.3 A G-type tank should be periodically tested and inspected in accordance with the requirements of the competent authority for road transport.

~~13.116.5 and 13.214.5~~

6.7.3.2.3.4 A G-type tank should be marked in accordance with 6.6.3.16. However, where the marking required by the competent authority for road transport is substantially in agreement with that of 6.6.3.16.1, it will be sufficient to endorse the metal plate attached to the road tank vehicle with "[IMO G type]".

~~13.1.24~~

6.7.3.3 RG-type

6.7.3.3.1 General

~~13.1.24.2~~

6.7.3.3.1.1 RG-type tank is a road tank vehicle, as defined in 6.7.1.1, and should either:

.1 comply with the requirements of 6.7.2; or

.2 be constructed as a RG-type tank, as defined in 6.7.1.1, complying with the requirements of 6.7.3.3.2 and 6.7.3.3.3.

~~13.102.18~~

6.7.3.3.1.2 Competent authority means, in respect of those requirements solely applicable to road tank vehicles, the authority concerned with approval for transport by sea and also the authority concerned with approval for transport by road.

~~13.216.5~~

6.7.3.3.1.3 A RG-type tank should not be offered for carriage by sea in a condition that would lead to venting during the voyage under normal conditions.

~~13.217.2~~

6.7.3.3.1.4 Provided the competent authority is satisfied with the modified tank arrangements, a higher initial degree of filling may be allowed when the intended voyage is considerably shorter than the holding time.

6.7.3.3.2 Design and Construction

6.7.3.3.2.1 The RG-type tank should comply with the requirements of 6.6.4, with the exception of:

.1 6.6.4.2.1, that jackets of aluminium may be used with the approval of the competent authority;

~~13.207.5~~

.2 6.6.4.6.1, that for RG-type tanks used for non-flammable refrigerated gases, one of the valves may be replaced by a frangible disc, and the frangible disc should rupture at a nominal pressure equal to the test pressure; and

.3 6.6.4.7.3.

~~13.212.1.2~~

6.7.3.3.2.2 If the landing legs of a RG-type tank are to be used as support structure, the loads agreed as in 6.6.4.2.12, should be taken into account in their design and method of attachment. Bending stress induced in the shell as a result of this manner of support should be included in design calculations. ~~13.203.14~~RG-type tank and its fastenings should be capable of withstanding such separately applied static and dynamic loads as may be agreed between the competent authorities.

~~13.114.5 and 13.212.2.1~~

6.7.3.3.2.3 Securing arrangements (tie-down attachments) should be fitted to the tank support structure and the towing vehicle of a RG-type tank. Semi-trailers unaccompanied by a towing vehicle should be accepted for shipment only if the trailer supports and the securing arrangements and the position of stowage are agreed by the competent authority.

6.7.3.3.2.4 For RG-type tanks the design calculations regarding the loads specified in 6.6.4.2.12 and 6.6.4.2.13 may be agreed between the competent authorities.

6.7.3.3.2.5 RG-type tanks may have a lesser shell thickness, subject to the agreement of the competent authorities.

6.7.3.3.3 Approval, testing and marking

~~13.116.2 and 13.214.2~~

6.7.3.3.3.1 For any RG-type tank intended for transport of a substance listed in the Dangerous Goods List, there should be in existence a valid certificate, issued by or on behalf of the competent authority for road transport, authorizing transport of that substance by sea.

~~13.116.3 and 13.214.3~~

6.7.3.3.3.2 The competent authority for sea transport or a body authorized by that authority should issue additionally in respect of a RG-type tank a certificate attesting compliance with the relevant design, construction and equipment requirements of this subsection and, where appropriate, the special tank type requirements for the gases in the Dangerous Goods List. The certificate should list the gases allowed to be transported.

~~13.214.4 and 13.116.4~~

6.7.3.3.3.3 RG-type tank should be tested and inspected in accordance with the requirements of the competent authority for road transport.

~~13.214.5~~

6.7.3.3.3.4 RG-type tanks should be marked in accordance with 6.6.4.15. However, where the marking required by the competent authority for road transport is substantially in agreement with that of 6.6.4.15.1, it will be sufficient to endorse the metal plate attached to the road tank vehicle with "[IMO RG-type]": the reference to holding time may be omitted.

***

ANNEX 5

CHAPTER 6.8

~~13.1.28~~

6.8 **Special requirements relating to portable tanks for the transport of solid substances and materials (e.g. powdery or granulated substances)**

~~13.1.28.1~~

6.8.1 Portable tanks used for the transport of solid dangerous substances and materials capable of flow should comply at least with the requirements for tanks. However, the required service equipment may be in accordance with 6.8.4.2 and 6.8.4.3.

~~13.1.28.2~~

6.8.2 The solid dangerous substances which may be transported in portable tanks are:

.1 solid dangerous substances and materials for which transport in portable tanks is indicated in the Dangerous Goods List;

.2 solid dangerous substances and materials for which transport in portable tanks is authorized by the competent authority; or

.3 solid dangerous substances and materials which are suitable for transport in metallic IBCs (see chapter 6.5). However, competent authority approval should be obtained where special requirement "7" or "12" applies for a particular substance or material, as mentioned in column 9 of the Dangerous Goods List. However, it is not necessary for the approval to contain a note to the effect that the competent authority has undertaken action to include this substance or material for transport in tanks in the Dangerous Goods List.

~~13.1.28.3~~

6.8.3 A number of solid materials (MHBs) (see 24.1.6 of the present IMDG Code) present no significant hazard when transported in packaged form. These materials are not covered in the Dangerous Goods List in this Code and, unless otherwise specified, there are no special requirements when transported in portable tanks.

~~13.1.28.4~~

6.8.4 Special requirements for portable tanks dedicated to the transport of solid substances and materials which do not liquefy during transport:

.1 The periodic hydraulic pressure tests for tanks used only in the dedicated transport of solid dangerous substances and materials, other than toxic or corrosive substances and materials, may be replaced by a suitable pressure test at 1.5 times the maximum allowable working pressure, subject to competent authority approval.

.2 Every bottom-discharge tank should be equipped with at least two serially mounted and mutually independent shutoff devices. An internal stop valve is not required.

.3 The design of the tank and the choice of materials, fittings and service equipment should be suitable for, and compatible with, the substances and materials to be transported.